USE OF ARTIFICIAL INTELLIGENCE IN GLOBAL PUBLIC ADMINISTRATIONS: ADVANCES AND PERSPECTIVES

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ABSTRACT

In this article, our main objective is to describe and debate whether the evolution of AI adoption in public administrations around the world is evolving consistently. The article is based on the Neoinstitutional theory. In methodological terms, we chose to analyze, based on recent literature and reports, the advances in the implementation of AI in public management, with an emphasis on the member countries of the Organization for Economic Cooperation and Development (OECD). We seek to identify the main actions to improve the efficiency and productivity of public services through the automation of administrative processes and reduction of bureaucracy; optimisation of decision-making based on real-time data analysis and provision of personalised services to citizens. The results of the discussions and analysis of the literature and reports show that the evolution of the use of artificial intelligence in the public sector is closely related to the structuring of an intelligent government, capable of responding to society's demands for better public management. Finally, it can be argued that the prospects for the use of artificial intelligence (AI) in public administrations around the world are varied and complex, reflecting both the opportunities and challenges associated with this technology. These changes are having a positive impact on the functioning of governments, as AI creates new opportunities to improve the performance of public administration.

Keywords: Artificial Intelligence. Generative Artificial Intelligence. Public administration. Governance. Improvement of Public Services.

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INTRODUCTION

The rapid and profound changes underway in the world in the last four decades, caused by the breaking of paradigms, arising from the fourth technological revolution – which involves the use of artificial intelligence (AI), are impacting the economies and public management of most countries (Matias-Pereira, 2023, p. 1). These changes are requiring initiatives to structure smart government, with a view to increasing performance in the way the nation-state operates, to improve the efficiency and productivity of public services through the automation of administrative processes and reduction of bureaucracy; optimize decision-making based on real-time data analysis and provide personalized services for citizens

Melati & Janissek-Muniz (2020), in their study on "Smart Government", mapped ten important dimensions that characterize intelligence in government: use of external data and information (D01); organizational culture for intelligence (D02); effective use of technology (Big Data; Business Intelligence) (D03); evidence-based decision (D04); interdepartmental and interorganizational collaboration (D05); innovation, co-creation, collective intelligence (D06); agility in government (D07); efficiency and effectiveness of management (D08); social engagement (D09); database organization and unification (D10).

In this effort to make government smart, the growing adoption of artificial intelligence in public administration deserves to be highlighted. The relevance of AI in the public sector has been recognized in the literature and reports of several international organizations, especially the Organization for Economic Cooperation and Development (OECD, 2024a), for its ability to face complex challenges to improve the performance of public administration.

From these initial considerations, it becomes possible to formulate the following question: *Is the adoption of artificial intelligence (AI) in global public administrations evolving consistently?*

Our main objective in this article is to describe and discuss whether the evolution of AI adoption in global public administrations is evolving consistently and contributing to the improvement of management, transparency, *accountability*, societal participation, integrity and quality of public services offered to citizens in several countries around the world.

The relevance of the topic is related to the urgency of modernizing public administration to meet the growing demands of society, using AI in a full-bodied way to improve the efficiency and productivity of public services. We assume in this article that

these innovations, supported by artificial intelligence (AI), are reflecting in a beneficial way in several sensitive areas for the population.

THEORETICAL FRAMEWORK

There are several relevant theories and concepts to guide the understanding of the subject that deals with the use of artificial intelligence in public administration, with emphasis on the Neoinstitutional and Agency Theories in Public Administration. Among these theories, we will rely, in particular, on the Neoinstitutional Theory (Selznick, 1972; Meyer & Rowan, 1977, Matias-Pereira, 2018), since we understand that the institutionalization of intelligence in public management contributes to facilitate government action in the face of uncertainties present in the environment, with a view to implementing new strategies in public policies and improving decision-making.

The assumptions of institutional theory will be used to support the issue of the institutionalization of intelligence in government (Selznick, 1972). It should be noted that institutional theory has been used as a theoretical support in numerous studies in different areas in the social sciences, with emphasis on the fields of economics, sociology, political science, administration and accounting, which seek to understand the social reality within systems such as organization, family and government (Matias-Pereira, 2018).

METHODOLOGY

This study adopted a qualitative and exploratory approach, using a bibliographic review of national and international articles, as well as reports from international organizations related to the use of AI in public administration. This method is characterized by assuming that multiple perspectives and interpretations are valuable to characterize the object of study. Considering the rapid advances in the field of artificial intelligence, the literature review was conducted with a specific scope, prioritizing recent and updated articles, as well as seminal studies. The research was carried out in January 2025, using the "*Web of Science*" and "*SciELO"* databases. Sets of keywords were selected as descriptors to broaden the search for articles, including "artificial *intelligence and public administration*"; "adoption of AI in public administration"; and "cases of the use of AI in public management". The articles were selected for their relevance to the theme of the study, published in high-impact scientific journals and number of citations, prioritizing the studies of seminal authors and the most recent articles. In addition to the selected articles,

searches were carried out on pages of official government websites, official government documents, reports published by multilateral organizations, especially the Organization for Economic Cooperation and Development (OECD), which work or study the topic of Artificial Intelligence.

EVOLUTION OF ARTIFICIAL INTELLIGENCE

It is relevant to recognize the importance of the seminal works of Warren McCulloch and Walter Pitts (1943, p. 113-135), who established the conceptual foundations using knowledge of brain neurons, propositional logic; and the studies of Alan Turing and John McCarthy that proposed the first fundamental concepts for the field of artificial intelligence (AI).

Turing (1950, p. 433-460), in his article "Computing Machinery and Intelligence" formulates the following question: 'I propose to consider the question: Can machines think? (see Turing test), which sought to determine whether a machine could exhibit intelligent behavior indistinguishable from that of a human. It was up to McCarthy (2007) to coin the term "artificial intelligence", and accepted as one of the main theorists responsible for the development of this area.

In the field of artificial intelligence, the contributions of Marvin Minsky; Allen Newell; Herbert Simon; Raj Reddy; Terry Winograd; Douglas Lenat; Claude Shannon; Frank Rosenblatt; John Hopfield; Geoffrey Hinton, among others.

CONCEPTS OF ARTIFICIAL INTELLIGENCE

The field of artificial intelligence (AI) is multidisciplinary, in which it seeks to develop technological solutions, systems, and machines capable of performing tasks autonomously that require human skills, such as speech recognition, learning, reasoning, problem-solving, and decision-making, and visual perception.

Artificial Intelligence (AI) is a technology deployed in a variety of sectors, with a general purpose and with the potential to improve well-being, contribute to positive sustainable global economic activity, increase innovation and productivity, and assist in current global challenges (OECD, 2024a).

> An AI system is a machine-based system that, for explicit or implicit purposes, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual

environments. Different AI systems *vary* in their levels of autonomy and adaptability after deployment *(OECD, 2023).*

It is relevant to remember that AI is a promising technology, which is constantly evolving. This characteristic is its main differential, which makes it difficult to define it clearly.

There are a multitude of purposes of AI, according to McCarthy (2007, p. 1-15): who maintains that "artificial intelligence is related to the use of computers to understand human intelligence, **not limited to biologically observable methods**".

It should be noted that AI has three different subareas, according to the functions it is capable of performing. The types of Artificial Intelligence, as described in Table 1, are classified into:

Table 1: Types of Artificial Intelligence

AI: Functions it is capable of disentangling
1. **Limited Artificial Intelligence (ANI),** also called Weak AI. It is a system designed to perform typical tasks with high performance, but limited to a specific domain or set of tasks. They are implemented with *machine learning algorithms and techniques*, such as neural networks, decision trees*, support vector machines* (SVM), and other machine learning methods.
2. Artificial General Intelligence (AGI), also identified by Strong Artificial Intelligence, refers to AI systems that have a high expertise in various areas and are capable of performing a wide range of cognitive tasks. Its fundamental characteristic is its ability to generalize and adapt to different domains and contexts. By way of comparison, while narrow AI specializes in specific tasks, AGI seeks to achieve a more comprehensive and versatile level of intelligence. However, the creation of an AGI is still in the speculative and theoretical stage, remaining a long-term goal for research and development in Artificial Intelligence.
3. Superintelligence (ASI), or, Self-Aware AI, refers to a level of intelligence that significantly surpasses human cognitive ability in all areas. This category of Self-Aware AI falls under a concept that is well advanced in the classification by level of similarity, that is, AI systems that have a self-awareness, with the ability to recognize their own existence and identity as separate entities. It should be pointed out that, the existence of self-aware AI is still a highly speculative and theoretical area.

Source: Elaborated by the author.

From the different concepts described here, it can be argued, succinctly, that AI is an area that seeks to develop systems capable of performing tasks that require human intelligence. It is a technology inserted in several sectors, whose central objective is to seek to improve well-being, contribute to stimulating economic activity, foster innovation and productivity, and assist in solving today's complex global challenges.

THE DEVELOPMENT OF GENERATIVE ARTIFICIAL INTELLIGENCE

Generative artificial intelligence is a newer area within AI. Although there is no single creator behind this discovery, many researchers and scientists have contributed to the

development of generative artificial intelligence, the work of Ian Goodfellow, who designed the architecture of Generative Adversarial Networks (GANs); and Yoshua Bengio, Geoffrey Hinton, and Yann LeCun, who made contributions to the field of Deep Learning, deserves to be highlighted. which is fundamental to generative AI.

Generative artificial intelligence has been evolving rapidly in recent years, with advances in machine learning algorithms, neural networks, and natural language processing techniques. It emerges as an evolution of deep learning techniques, using models such as Adversarial Generative Neural Networks (GANs) and Pre-trained Generative Transformers (GPT) to create original and authentic content autonomously.

Thus, generative artificial intelligence is AI systems built to create new and original content, based on the data with which they are trained. This can include generating text, images, music, programming code, and even 3D models. Unlike discriminative AI, which is used to classify and categorize data, generative AI creates new data using probabilistic models to generate outputs based on the patterns it has learned from the input data.

Generative AI is applied in financial services; healthcare and life sciences; automotive and manufacturing; telecommunications; media and entertainment; science and medicine; drug discovery; medical imaging, personalized treatment plans, and more. It makes it possible to increase productivity; efficiency in data processing; complex problem solving; cost reduction and optimization of existing systems. Among its applications are the generation of text and images; development of programs, games and simulations; interface design and fraud detection, among others. The major players in the generative AI space are OpenAI, Anthropic, Hugging Face, Inflection, and DeepSeek.

Generative AIs, such as ChatGPT or Gemini, are also trained by humans. There are also generative AIs that can create images and videos, such as the Leonardo.ai platform, and that generate music, such as Soundful. Conceptually, generative AI is any technology in the form of a platform or application that can create content, including creative content.

Generative models have been used for years in statistics to analyze numerical data. But over the past decade, they've evolved to analyze and generate more complex types of data.

It is also noted that governments around the world are making efforts to intensify the use of generative AI to **modernize public administration** and offer **better quality and accessible public services** to citizens. This statement is confirmed by the global research study called "Your Journey to a GenAI Future: A Strategic Path to Success for Government

(SAS, 2024)", which reveals that governments are taking GenAI seriously, and that generative AI is expected to advance consistently by 2025, with 84% of organizations looking to implement the technology at scale.

ADOPTION OF NATIONAL ARTIFICIAL INTELLIGENCE STRATEGIES IN THE WORLD

Few countries until the year 2017 had national AI strategies. Currently, as evidenced in data from the OECD Policy Observatory. AI, there are more than 50 national and government strategic initiatives for trustworthy AI. All OECD members and partner countries in the Arab region, Africa and South America are promoting the OECD AI Principles. Governments, as of May 2023, reported more than 930 policy initiatives in 71 jurisdictions in the OECD national policy database. OUCH. It should be noted that governments are using different governance models to manage national AI policies (OECD, 2024a).

DISCUSSION OF THE IMPORTANCE OF AI ADOPTION IN PUBLIC ADMINISTRATION

71 use cases of AI in governments around the world were identified, with applications that include formulating public policies, improving operational efficiency, and improving public services. About 70% of the countries surveyed already use AI to automate processes, analyze large volumes of data, and improve their internal operations (OECD, 2024a).

Artificial intelligence (AI) is transforming every aspect of our lives. It influences how we work and play. It promises to help solve global challenges such as climate change and access to quality medical care. However, AI also brings real challenges for governments and citizens (OECD, 2024a).

Several authors, such as Smith (2020) and Johnson & Khanna (2021) show that the integration of artificial intelligence (AI) technologies in public services has been a growing trend around the world, playing a crucial role in the transformation of sectors such as health, education, security, and resource management.

The adoption of AI in government is not just a technological trend, but a necessary evolution to address complex contemporary challenges. Governments around the world are exploring how AI can be used to optimize services, from simplifying bureaucratic processes to improving the delivery of health and education services. In addition, AI offers

unprecedented capabilities in analyzing large volumes of data, allowing for more informed and strategic decision-making (Silva & Rocha, 2020).

For Public Administration in particular, Artificial Intelligence delivers elements of Science for the creation and management of Public Policies: AI helps in recognizing patterns of need of groups in the population, helps to develop programs based on empirical evidence, predict results, and analyze the effectiveness of these policies (PATEL et al., 2021).

The emergence of Artificial Intelligence for the field of Management has awakened the need to reimagine the structure and knowledge of contexts and practices of value creation, since it promotes increasingly broad interactions between different interest groups. As a result, AI is more than a change in the technological environment, as it has implications for business and social relations (CORSARO et al., 2022).

There is a growing awareness that, if used strategically and responsibly, artificial intelligence (AI) has the potential to transform how governments work, shape policy, and deliver services. Governments have various roles in relation to AI, as enablers, funders, regulators, but also as users and, in some cases, as developers. While the global debate on AI has tended to focus on the role of governments as regulators in shaping and responding to the application of AI, less attention has been paid to their responsibilities as users of AI. As governments seize the opportunities of AI for better governance and deploy solutions across a wide range of policy areas, they recognize the need to govern AI in the public sector to prevent misuse and mitigate risks. (OECD, 2024b, p. 3).

EVIDENCE OF THE ADVANTAGES OF INTEGRATING AI IN PUBLIC ADMINISTRATION

As evidenced in the literature and in the reports analyzed, the adoption of AI to support public officials, contributing to increase the efficiency, effectiveness, and quality of public services offered to the population in a significant portion of countries in the world, has been increasing rapidly. AI is used in the automation of administrative processes; data analysis; virtual assistance based on Chatbots; performance monitoring; personalization of services, with efficiency and speed, which means that AI automates repetitive tasks, reduces bureaucracy and processing time, providing quick responses to citizens.

Recent OECD reports demonstrate that OECD countries are consistently making serious efforts to better understand AI systems and use the opportunities they offer to transform the government machine. These countries have realized that the responsible use

of AI can improve the performance of government administrations in several areas, as described below:

- The adoption of AI in the public sector can contribute to helping governments increase productivity with more efficient internal operations and more effective public policies.
- AI can help make the design and delivery of public policies and services more inclusive and responsive to the evolving needs of specific citizens and communities.
- AI can strengthen the accountability of governments by increasing their oversight capacity and supporting independent oversight institutions.

It should be noted that the adoption of AI in public administration is still at an early stage. Efforts need to be made to better understand how to successfully implement AI initiatives. Despite the potential benefits of AI, there are also growing concerns about the risks of a fragmented and ungoverned deployment of AI in the public sector. The public sector has a special responsibility to implement AI in a way that minimizes harm and prioritizes the well-being of individuals and communities, especially when implementing AI in sensitive policy domains such as law enforcement, immigration control, social benefits, and fraud prevention. Governments are working to establish an environment that enables the safe, secure, and reliable development, deployment, and use of AI to maximize the benefits and address the associated challenges (OECD, 2024a: OECD, 2024b, p. 13-14)

EVIDENCE OF THE RELEVANCE OF AI ADOPTION IN PUBLIC ADMINISTRATION

Analysis of the studies and reports, highlighted below, show that there is currently numerous evidence of the relevance of the adoption of AI in public administration. In this sense, it is observed that there are several reasons to use Artificial Intelligence in Public Management. These reasons range from the concern with optimizing a process to government oversight, in which AI systems have been used to raise the level of transparency of administrative acts and the accountability of agents, detecting fraud and managing risks. These motivations tend to vary depending on the conditions and needs of each area of public administration.

Toledo & Mendonça (2023) argue that public administration, at its various levels, has recognized the potential of AI as a powerful tool to improve the quality of services offered to

the population, and can be applied in several areas, from the automation of routine tasks to advanced data analysis for decision-making.

The integration of AI in public administration has been a key strategy to boost the efficiency and quality of services offered to citizens. The automation of bureaucratic processes, the increase in productivity, and the success stories observed in Brazilian public agencies highlight the importance and practical benefits of this technology. However, to fully take advantage of AI, it is crucial that public servants are adequately prepared to deal with digital changes and maximize the potential of these innovations in public administration (Toledo & Mendonça 2023).

Governments have started to rely on artificial intelligence (AI) to deliver services and improve operations, but the use of it to help shape policy is just beginning. The foundations of policymaking—specifically, the ability to sense patterns of need, develop evidence-based programs, forecast outcomes, and analyze effectiveness—fall squarely in AI's sweet spot. AI will not replace policymakers, but it can enable a comprehensive, faster, and more rigorous approach to policymaking in the short run. More broadly, AI can deliver on the promise of a government of the future that is more responsive and leaves no one behind (Patel, et al., 2021).

The study of AI in the public sphere is vital due to its potential to increase operational efficiency, reduce costs, and improve the quality of decisions through data analysis. AI can provide innovative solutions to persistent challenges in critical sectors such as healthcare, education, security, and resource management, which are often constrained by limited resources and increasing demands. Therefore, its exploitation transcends opportunity, becoming a pressing need for the Brazilian public administration (Barros & Oliveira, 2021a).

In the healthcare industry, AI has been instrumental in the development of advanced and personalized diagnostic systems. For example, in Finland, AI systems are used to analyze large volumes of patient data, allowing for faster and more accurate diagnoses of diseases such as cancer and diabetes. Additionally, AI-based virtual assistants have been implemented to manage appointments and optimize patient flow in hospitals, improving operational efficiency (Nielsen, 2021).

In education, AI has transformed the way content is delivered and personalized to meet the individual needs of students. In Singapore, adaptive learning platforms that use AI to analyze student performance are being employed to provide personalized educational

resources, significantly increasing student engagement and achievement (Chen & Wong, 2020).

In the field of public safety, AI has been a valuable tool for data analysis and surveillance. In the UK, AI-based facial recognition systems are used to identify individuals in public places and assist in crime prevention, demonstrating the technology's ability to improve public safety without compromising efficiency (Taylor, 2022).

The adoption and implementation of Artificial Intelligence (AI) technologies in the Brazilian public sector represent a crucial step towards the modernization and optimization of the services offered to citizens. While AI offers significant promise for transformation in essential areas such as health, education, and security, it also faces a set of challenges that are critical to the success of its integration into the country's public administrations (Ferreira & Oliveira, 2022).

Countries such as the United States, Japan, and Germany have extensively implemented AI to optimize public services, from health to safety and education. For example, in the United States, AI is utilized to improve energy efficiency in public buildings, while in Japan, AI technologies assist in the monitoring and care of the elderly, a critical service given the aging population (Smith, 2020; Yamada, 2021).

The most significant challenges of AI are related to transparency and accountability, ethical issues due to data protection concerns, and the possibility of excluding certain groups of citizens from the benefits of technology. The third significant challenge is related to costs and resources, as the development and implementation of AI solutions require significant investments and advanced technological resources. Another particularly important aspect resulting from the analysis is the need to develop regulations and standards to govern the use of AI in public administration and ensure compliance with existing laws. (Androniceanu, 2024, p. 115-116)

It is also relevant, in order to increase the level of consistency of the study, to cite some successful *cases*, which highlight the relevance of the adoption of AI in public administration in the world.

Table 2. Use of Artificial Intelligence in Public Administration

AI: Success stories around the world
1. United Kingdom – AI for Health Care Improvement. Project: The UK's National Health Service (NHS) uses AI to analyze large volumes of medical data, aiding in the early diagnosis of diseases such as cancer. **Results:** AI has helped identify cancer cases in early stages, increasing survival rates and reducing costs with more complex treatments.

2. Singapore – AI for Urban Management and Demand Forecasting. Project: The government uses AI to optimize urban management, including traffic monitoring, forecasting public transport demands, and predictive infrastructure maintenance. **Results:** AI helped reduce congestion, improve the efficiency of public transportation, and anticipate infrastructure problems before they become critical.

3. United States – California. AI for Fraud Prevention in Social Benefits. Project: The state of California has implemented AI systems to detect fraud in social benefit programs such as Medicaid and SNAP (Supplemental Nutrition Assistance Program). **Results:** AI identified suspicious patterns and significantly reduced fraud cases, saving the government millions of dollars.

4. United States – Fire Prevention in Pittsburgh. Project: Pittsburgh Fire Department uses an AI system to predict fire hazards. **Results:** Using historical data, the system identifies areas with the highest probability of incidents, allowing you to prioritize safety inspections.

5. Estonia – AI for Digital Public Services. Project: Estonia uses AI to automate public services, such as tax processing and civil records management. **Results:** Automation has reduced document processing time and increased the efficiency of public services, making the country one of the most digital in the world.

6. Canada – AI for Emergency Management. Project: The government uses AI to predict and manage natural disasters, such as floods and wildfires. **Results:** AI has helped predict extreme weather events with greater accuracy, allowing for faster and more effective responses, as well as reducing damage and associated costs.

7. India - AI for Identification of Beneficiaries of Social Programs. Project: The government has deployed AI systems to identify and verify beneficiaries of social programs, such as food and fuel subsidies. **Results:** AI helped reduce errors and fraud, ensuring that benefits reached the right people and saving public resources.

8. France – AI for Citizen Service. Project: Chatbot Albert, an AI tool that helps public servants answer frequently asked questions from citizens. Results: The system processes more than 16 million requests, allowing servers to focus on more complex issues.

9. South Korea – AI for Public Policy. Project: Uses AI to formulate more effective public policies. **Results:** The government analyzes real-time data to make decisions related to medical quarantines and geolocation of health incidents, allowing for rapid responses to health emergencies and efficient allocation of resources.

10. Finland - AuroraAI Platform. Project: AuroraAI platform, which connects various digital public services, offering personalized and proactive services to citizens. **Results:** Through *machine learning*, the system identifies user needs and delivers the right services at the right time, improving the citizen experience and saving public resources.

11. Japan – AI for Aging Population. Project: Japan uses AI to address the challenges of an aging population, such as managing health care and forecasting demands for social services. **Results:** AI has helped to optimize the allocation of health resources and predict future needs, improving the quality of life of the elderly.

12. Brazil - AI for Public Bidding Analysis. Project: The Federal Court of Accounts (TCU) in Brazil uses AI to analyze public bidding processes and identify irregularities. **Results:** AI has helped detect suspicious patterns and increase transparency and efficiency in public procurement.

Source: Elaborated by the author.

It is important to note that, although artificial intelligence represents one of the main technological advances of the twenty-first century, its application in the public sector is still in its early stages. In turn, global experience has shown that the responsible use of AI systems in Public Administration can transform the provision of services. AI has the potential to improve efficiency, transparency, cost reduction, and ultimately provide input for more effective and inclusive public policies.

The perceptions made explicit in the various studies and reports cited here, that AI is having a transformative impact on public administration, stems from the realization that AI

technologies are capable of optimizing administrative processes, improving the efficiency of services, and performing predictive analytics that allow increasing the effectiveness of public policies. The most promising segments of AI adoption in public administration are related to the areas of automation of citizen services and services, allocation of resources more efficiently and effectively, public procurement; health, education and security management, aimed at improving the fulfillment of the population's demands.

CONCLUSIONS

The studies, reports and success stories presented in this study highlight the transformative potential of AI in the public sector. Despite the potential benefits of AI, it is important to note that there are concerns about the possible risks of implementing AI in a fractional and disorganized way in the public sector.

It can be seen that artificial intelligence (AI) has been playing a very relevant role in world society, having a beneficial impact on numerous aspects of people's lives. The analyses and data on display also show that the use of AI in global public administrations is varied and complex, reflecting both the opportunities and challenges related to this technology.

Thus, it can be argued that the adoption of AI contributes to the generation of positive results, creating new opportunities for public administration, notably to improve the efficiency, effectiveness, and productivity of public services, carried out through the automation of administrative processes and reduction of bureaucracy; helps in decision-making, based on access to real-time data and the provision of personalised services for citizens.

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